Summer 2018

Relationships Between Fluvial Ecosystems and the Iowan Erosion Surface

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ABSTRACT

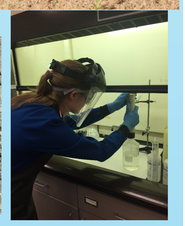
The streams and rivers of the Iowan Surface partially form the foundation of our local ecosystems, everything from providing drinking water to producing floods. The Black Hawk Creek, Cedar River, and Maquoketa River were studied in the months of June and July of 2018. The goal of the research was to understand the ecology of each water way, how life was sustained by these rivers and creek and how the surrounding landscape may have determined the features of the waterways. Datasheets were filled out describing the sites' ecological and geologic makeup, and GIS Trimble units were used to chart the points on a map. Wildlife observations were calculated for each river and creek. Black Hawk Creek wildlife was comprised of 35% mammals, 31% waterfowl, 23% amphibians, and 11% reptiles. The Cedar River had 64% waterfowl, 18% mammals, 9% reptiles and amphibians. Lastly, the Maquoketa River resulted in 30% mammals sightings and amphibians, 20% reptiles and waterfowl. Future work will determine how accurate the study was by testing different techniques and sampling times.

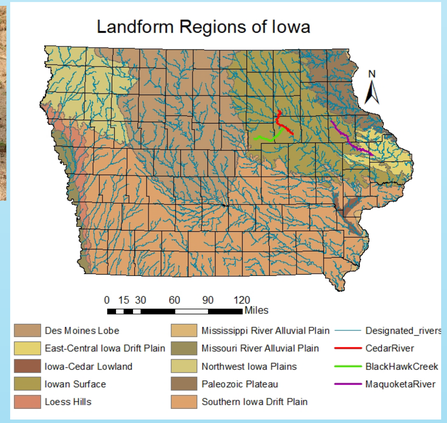
INTRODUCTION

This research examines the ecology of fluvial sections: Black Hawk Creek (Grundy Center to Hudson) the Cedar River (Waverly to Gilbertville) and the Maquoketa River (Manchester to Canton). The majority of these waterways are located on the Iowa Erosion Surface (IES). The IES is characterized as an Early to Mid-Pleistocene glaciated landscape with a gently rolling topography (Prior, 1991). The goals of this research are to characterize the geomorphology of the IES, identify potential relationships between geomorphology and ecology, to interpret the urban and rural impacts on the IES's fluvial ecosystems and ideally suggest best practices for improving IES habitats.

Fluvial surveys were conducted by kayaking - recording fluvial, biologic and environmental data. If a large animal, like a deer, was recorded, that may indicate the ecosystem is healthy because it can support a large creature (Cairns et al., 1992).

The hypotheses are: A) All waterways on the IES will have the same diversity of life. B) Rivers will have more individuals/species, but the diversity will be the same as the creeks.

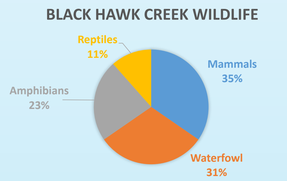


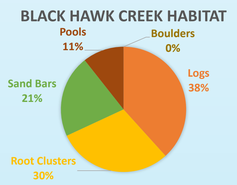


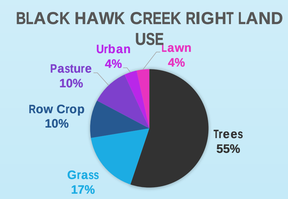
METHODS

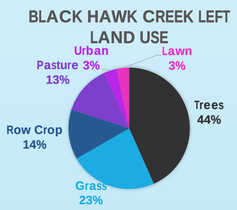
A. Datasheets were developed after the Environmental Protection Agency's (EPA)'Stream Corridor Assessment Worksheet': Fluvial (e.g. width, depth, sediment type, bank stability), Biologic (e.g. Vegetation type/concentration, Wildlife type/concentration), Environmental (Land-use, turbidity, pH, TDS, temperature)
B. Data and samples (sediment and water) were collected after major landscape changes
C. Trimble Juno Series 3B were used to map sample sites, take digital notes and develop a Geographic Information System.

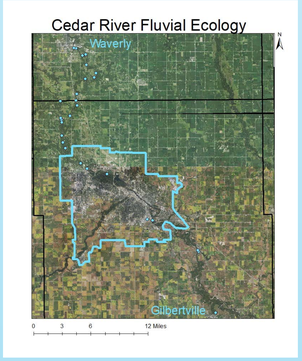
OBSERVATIONS

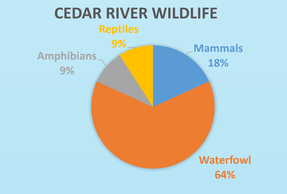


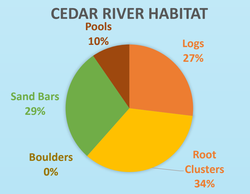


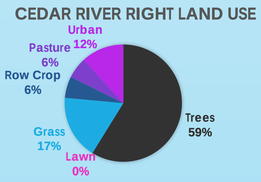


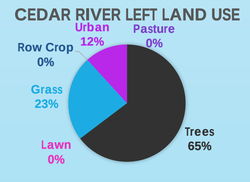


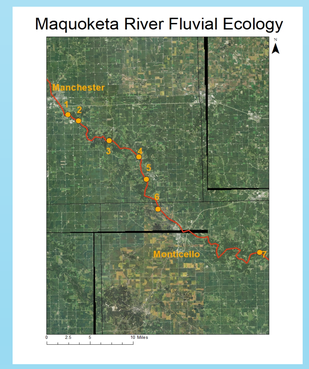


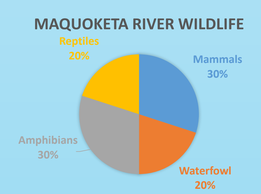


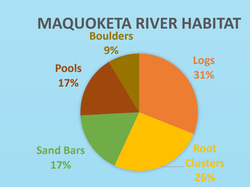


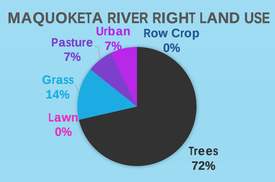


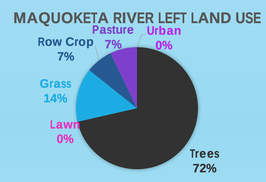












DISCUSSION

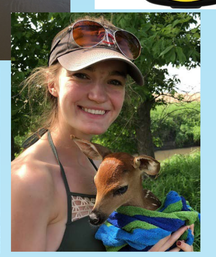
We have been making observations for the past two months. Black Hawk Creek had the smallest amount of total habitat and the most livestock access in comparison to the other waterways. Wildlife spotted in this region was diverse and the areas affected by agriculture still had wildlife sightings. The Cedar River, while being the largest river, did not have an abundant amount of habitat. What habitat was available was occupied by mostly waterfowl including three herons who flew together. The Maquoketa River's sampling was disrupted by Project A.W.A.R.E, which was a group of about 300 people in canoes picking up garbage, so the wildlife that was active was an inaccurate depiction of the river's ecosystem. The diversity of the creatures observed was the highest suggesting a well-established fluvial ecosystem.

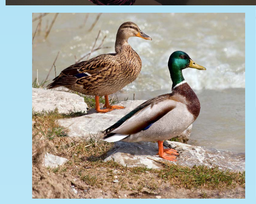
In reference to the study's hypotheses, the diversity of life varied per water way, but further study may present more species for each waterway. So, the first hypothesis was proven incorrect, but that result may change with more data. The second hypothesis, that rivers will have more individuals than creeks was correct. Only one heron was spotted on Black Hawk Creek, while three were spotted in a single trip on the Cedar River.

FUTURE WORK

More observation trips will be made on the Cedar River and Black Hawk Creek with the same sampling methods. Changes to the process will include taking the time of day into more account than previous samples because animals are active at different times of day. Taking more stops along the banks will also be a new change because the most sightings happened while we were stopped.

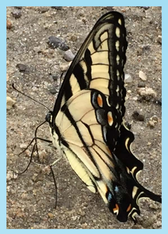
Another possibility of taking samples would be to use a different form of collecting observations. Such as a tally system on a larger already established program.





Helpful Iowa Digital Links

GIS
https://geodata.iowa.gov/
Reptiles
https://www.iowaherps.com/
Birds
http://www.iowabirds.org/birds/
Floods
https://iowafloodcenter.org/
Water levels
https://waterdata.usgs.gov/ia/nwis/rt
Geologic mapping
https://www.iihr.uiowa.edu/igs/publications/map/



REFERENCES and ACKNOWLEDGMENTS

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This Research & Engineering Apprenticeship Program (REAP) project is funded through the Army Educational Outreach Program (AEOP) and by the University of Northern Iowa.

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